Complete Summary

GUIDELINE TITLE

Clinical practice guideline for the management of postoperative pain.

BIBLIOGRAPHIC SOURCE(S)

Department of Defense, Veterans Health Administration. Clinical practice guideline for the management of postoperative pain. Version 1.2. Washington (DC): Department of Defense, Veterans Health Administration; 2002 May. Various p.

GUIDELINE STATUS

This is the current release of the guideline.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory information has been released.

On April 7, 2005, after concluding that the overall risk versus benefit profile is unfavorable, the FDA requested that Pfizer, Inc voluntarily withdraw Bextra (valdecoxib) from the market. The FDA also asked manufacturers of all marketed prescription nonsteroidal anti-inflammatory drugs (NSAIDs), including Celebrex (celecoxib), a COX-2 selective NSAID, to revise the labeling (package insert) for their products to include a boxed warning and a Medication Guide. Finally, FDA asked manufacturers of non-prescription (over the counter [OTC]) NSAIDs to revise their labeling to include more specific information about the potential gastrointestinal (GI) and cardiovascular (CV) risks, and information to assist consumers in the safe use of the drug. See the FDA Web site for more information.

COMPLETE SUMMARY CONTENT

** REGULATORY ALERT **
SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS
CONTRAINDICATIONS
QUALIFYING STATEMENTS
IMPLEMENTATION OF THE GUIDELINE
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT

CATEGORIES
IDENTIFYING INFORMATION AND AVAILABILITY

SCOPE

DISEASE/CONDITION(S)

Postoperative pain

GUIDELINE CATEGORY

Evaluation
Management
Treatment

CLINICAL SPECIALTY

Anesthesiology
Critical Care
Neurological Surgery
Ophthalmology
Orthopedic Surgery
Surgery
Thoracic Surgery

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Nurses
Physician Assistants
Physicians
Students

GUIDELINE OBJECTIVE(S)

- To promote evidence-based management of individuals' postoperative pain
- To identify the critical decision points in management of patients with postoperative pain
- To develop a collaborative pain management plan with the patient
- To provide appropriate patient and family education
- To optimize the use of therapy to control symptoms
- To reduce the incidence and severity of patients' postoperative pain
- To minimize preventable postoperative complications and morbidity
- To improve local management of patients with postoperative pain and thereby improve patient outcomes

TARGET POPULATION

Adults (age >17) within the Veterans Health Administration (VHA) and Department of Defense (DoD) health care systems who are undergoing a procedure or operation and for whom pain management is warranted

INTERVENTIONS AND PRACTICES CONSIDERED

Preoperative Evaluation

1. History and physical examination
2. Imaging studies
3. Pain assessment including Numeric Rating Scale (NRS) and a short form of the McGill Pain Questionnaire (SF-MPQ)
4. Review pain prevention and control options with patients including physical and cognitive non-pharmacological interventions and pharmacologic management:

   Non-pharmacologic management, cognitive modalities

   - Distraction
   - Relaxation
   - Hypnosis

   Non-pharmacologic management, physical modalities

   - Transcutaneous electrical nerve stimulation (TENS)
   - Heat
   - Cold
   - Exercise
   - Positioning
   - Immobilization/rest
   - Massage and acupuncture

   Pharmacologic management

   - Use of different routes including oral, intramuscular (IM), intravenous (IV), intravenous patient-controlled administration (IV PCA), regional, epidural, and spinal
   - Opioids
   - Acetaminophen and nonsteroidal anti-inflammatory drugs
   - Local anesthetics
   - Glucocorticoids
5. Individualized preoperative education
6. Initiate preemptive pain management measures including

Postoperative Evaluation

1. Assessment of vital signs, respiratory system, circulatory system, neurological system, pain, nausea, and vomiting
2. Assessment of postoperative pain
3. Providing pain control by either pharmacologic, cognitive, and/or physical intervention

4. Identification of patients with a significant complication
5. Providing education to patients regarding post procedural comfort
6. Determination of patient's response to pain relief
7. Adjusting pain management as appropriate to minimize side effects
8. Re-evaluation as appropriate
9. Providing discharge plan

MAJOR OUTCOMES CONSIDERED

- Postoperative experience (e.g., degree of pain, complications, patient functioning, and quality of life)
- Morbidity associated with unmanaged pain
- Side effects of interventions used to treat pain

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The working group leaders were solicited for input on focal issues prior to a review of the literature, and a working list of questions was generated. Electronic searches of the Cochrane Controlled Trials Register (Cochrane Reviews) were undertaken. Full texts or abstracts of the Cochrane reviews were provided to the experts at the May 2000 meeting. In addition, a search was carried out using the National Library of Medicine's (NLM) MEDLINE database. Papers selected for further review were those published in English-language peer-reviewed journals between 1980 and 2000. Preference was given to papers based on randomized, controlled clinical trials, or nonrandomized case-control studies. Studies involving meta-analysis were also reviewed. In addition, the assembled experts suggested numerous additional references. Copies of specific articles were provided to participants on an as-needed basis. The guideline document includes references through the year 2000.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

The rating schemes were derived from the U.S. Preventive Services Task Force Guide to Clinical Preventive Services, Second Edition (USPSTF, 1996).

Quality of Evidence

I Evidence is obtained from at least one properly randomized controlled trial (RCT).

II-1 Evidence is obtained from well-designed controlled trials without randomization.

II-2 Evidence is obtained from well-designed cohort or case-control analytical studies, preferably from more than one center or research group.

II-3 Evidence is obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments could also be regarded as this type of evidence.

III Opinions of respected authorities are based on clinical experience, descriptive studies in case reports, or reports of expert committees.

The working group reviewed the articles for relevance and graded the evidence using the rating scheme published in the U.S. Preventive Service Task Force Guide to Clinical Preventive Services, Second Edition (USPSTF, 1996). The experts themselves formulated Quality of Evidence (QE) ratings after an orientation and tutorial on the evidence grading process. Each reference was appraised for scientific merit, clinical relevance, and applicability to the populations served by the Federal health care system. The QE rating is based on experimental design and overall quality. Randomized controlled trials (RCT) received the highest ratings (QE=I), while other well-designed studies received a lower score (QE=II-1, II-2, or II-3). The QE ratings are based on the quality, consistency, reproducibility, and relevance of the studies.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The current guideline for the management of postoperative pain represents hundreds of hours of diligent effort and consensus building among knowledgeable individuals from the Veterans Health Administration, Department of Defense, academia, and guideline facilitators from the private sector. The process of developing this guideline was evidence-based whenever possible. Where evidence

is ambiguous or conflicting, or where scientific data are lacking, the clinical experience of the working group was used to guide the development of consensus-based recommendations.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

The rating schemes were derived from the U.S. Preventive Services Task Force Guide to Clinical Preventive Services, Second Edition (USPSTF, 1996).

Recommendation Grades

A. A strong recommendation, based on evidence or general agreement, that a given procedure or treatment is useful/effective, always acceptable, and usually indicated.
B. A recommendation, based on evidence or general agreement, that a given procedure or treatment may be considered useful/effective.
C. A recommendation that is not well established, or for which there is conflicting evidence regarding usefulness or efficacy, but which may be made on other grounds.
D. A recommendation, based on evidence or general agreement, that a given procedure or treatment may be considered not useful/effective.
E. A strong recommendation, based on evidence or general agreement, that a given procedure or treatment is not useful/effective, or in some cases may be harmful, and should be excluded from consideration.

The USPSTF grading process suggests assigning a second grade that reflects the strength of the recommendation (SR) for each appraised study. The evidence grade score (i.e., the SR) reflects the significance of the evidence as drawn from the scientific studies, but does not always reflect the importance of the recommendation to individual patient care. Often, the most basic patient management questions and well-accepted care strategies are the most difficult to test through RCTs (i.e., QE = I), especially when experimental design puts patients at risk. For example, no RCTs have been conducted to quantify the value of administering supplemental oxygen to a patient who presents with an AMI.

In lieu of the SR rating, the recommendation rating (R), using a rating scale from A to E has been formulated. The specific language used to formulate each recommendation conveys panel opinion of both the clinical importance attributed to the topic and the strength of evidence available. When appropriate and necessary, expert opinion was formally derived from the working group panel to supplement or balance the conclusions reached after reviewing the scientific evidence.

The rating of R is influenced primarily by the significance of the scientific evidence. Other factors that were taken into consideration when making the R determination are standards of care, policy concerns, and cost of care, and potential harm.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Clinical Validation-Trial Implementation Period
Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The method of guideline review is broadly described in "Guidelines for Guidelines" on the Veterans Health Administration (VHA) Web site and applicable to all guidelines developed by Veterans Affairs/Department of Defense (VA/DoD). Briefly, a final draft of the guideline is distributed for field testing, comment and independent review. Network designated staff are asked to use the guideline in the direct care setting and provide feedback to key personnel and/or directly to the guideline development experts via the web page available for online comment. This portion of the field test is intended to provide feedback regarding the format and usability of the guideline and the companion implementation tools/guideline summary and pocket cards. Peer review of the guideline is completed by at least three VA/DoD staff, including primary care clinicians, who have been trained and previously assigned to perform the independent review.

After final editing to incorporate feedback as appropriate, the guideline, tools, and comments are submitted to the National Clinical Practice Guideline Council for review. This Council's recommendations and a summary of the guideline and the provider tools are forwarded to the Under Secretary for Health for signature and distribution.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The recommendations for the management of postoperative pain are organized into two major algorithms. Each algorithm, the annotations that accompany it, and the evidence supporting the recommendations are presented below. The recommendation grading (A-E) and the quality of evidence (I-III) are defined at the end of the "Major Recommendations" field.

Management of Postoperative Pain - Preoperative Management Algorithm

Management of Postoperative Pain - Postoperative Management Algorithm

Preoperative Pain Management

A. Patient is a Candidate for Procedure/Operation

Patients managed by this guideline are adults (age ≥ 17) within the Veterans Health Administration and Department of Defense health care systems who are undergoing a procedure or operation and for whom pain management is

warranted. In an emergency procedure, implementation is determined by the time available and patient status.

B. Conduct Preoperative Patient Evaluation

Objective

Identify factors, both clinical and psychosocial, that may impact the postoperative pain management plan.

Annotation

Most of the information needed to develop a postoperative pain control plan is contained in a routine history and physical examination. In order to provide effective pain control, the clinician should pay particular attention to the following specific questions:

Chief Complaint--What is the planned surgical procedure? What are the circumstances under which the procedure is being performed? Is the procedure elective or emergent? Does the patient have acute pain?

Past Medical History--What concurrent medical problems are present? Are there any known problems with coagulation? Are there congenital abnormalities? Are there concurrent neurologic diseases such as multiple sclerosis, muscular dystrophy, stroke, mental dysfunction, amyotropic lateral sclerosis or peripheral neuropathy, among others? Is there a history of prior trauma to the proposed surgical site? Is there a history of infection or respiratory difficulty?

Past Surgical History--Is there any history of surgery (e.g., spine surgery)?

Medications--What medications is the patient currently taking? Is the patient taking any anticoagulants that would alter choices for postoperative pain control? Is the patient taking opiates on a chronic basis? Is the patient taking any monoamine oxidase inhibitors (MAOIs) medications?

Allergies--Is the patient allergic to any of the opiates, local anesthetics, nonsteroidal anti-inflammatory drugs, agonist-antagonists, corticosteroids or any other medications commonly used to provide postoperative pain control?

Psychosocial History--Is there any history of drug or alcohol abuse or addiction?

Past Pain History--Does the patient have chronic pain? How is the chronic pain currently being treated? What postoperative pain control methods were used successfully or unsuccessfully? Did the patient develop side effects from the chosen method?

Physical Examination--Are there patient characteristics (i.e., physical or mental abnormalities) that preclude the use of certain postoperative pain control techniques? Will the surgical procedure involve the insertion areas for

regional or neuraxial analgesia techniques? Are there signs of infection at the site of proposed needle insertion?

Imaging Studies--Are there physical anatomic abnormalities, either congenital or acquired, that involve the proposed site for a pain control technique?

Pain Assessment--If the patient reports any pain, a pain assessment needs to be completed. This assessment may help in evaluation of postoperative pain. See the "Pain Assessment" section of the full text guideline for detailed information on pain assessment.

C. Discuss Treatment Options with Patient and Develop Collaborative Plan

Objective

Establish a collaborative approach for pain management based on the patient's understanding about, and acceptance of, available treatment options.

Annotation

- Review with the patient the available options for pain prevention and control including physical and cognitive non-pharmacologic interventions, as well as pharmacologic management (i.e., oral [PO], intramuscular [IM], intravenous/patient-controlled analgesia [IC/PCA], regional, epidural, and spinal). Consider a multimodal approach.
- Answer the patient's questions and provide patient education material (see section in full text guideline "Education For Pain Management").
- Patient refusal is a contraindication to any treatment option.
- The treatment plan must be acceptable to the surgeon as well.

For a review of the options, refer to the Summary Table in the section "Site-Specific Pain Management" in the full text guideline.

D. Provide Patient and Family Education

Objective

Prepare the patient for treatment interventions that promote postprocedural comfort.

Annotation

One of the primary concerns of patients and their significant others is the pain and discomfort following surgery. Patients respond differently to pain depending on their prior experience, emotional state, and level of anxiety. Individualized preoperative education may favorably alter this experience by reducing anxiety and allaying preconceived fears (Voshall, 1980).

Information to be included in pain education preoperatively should address the following:

Expectations:

- Effect of pain management on healing and reducing complications after surgery
- Expectation of pain and individual nature of pain experience. Review the expected severity and duration for specific type of surgery. See Table ED-1: Patient Education Trajectory Table in the "Education for Pain Management" section in the original guideline.
- Expectation that pain can be controlled following surgery
- Goals for pain relief

Assessment:

- Ways of assisting in the measurement of pain
- What patients should report regarding pain and its treatment

Postoperative Plan:

- Postoperative pain management plan (i.e., specific information about the interventions)
- Importance of patient involvement in the plan (e.g., controlling patient-controlled analgesia)

Interventions:

- How quickly the pain intervention should work
- When to ask for pain medication
- Patient concerns about the intervention (e.g., side effects, addiction, and complications)
- Non-drug measures for pain relief (explain those applicable)
    - Relaxation
    - Physical modalities
    - Distraction
    - Hypnosis

Evidence

Individualized preoperative education may favorably alter the pain experience. (III, B [Voshall, 1980]; III, A [Owen et al., 1990])

E. Initiate Preemptive Measures for Pain Management, as Indicated

Objective

Initiate interventions prior to operation in order to prevent or enhance postoperative pain control.

Annotation

Some procedures/interventions will be more beneficial if the patient had prior experience or training (e.g., hypnosis and relaxation technique) prior to the operation. For certain procedures, specific interventions need to be undertaken before the procedure (e.g., see amputation in the "Site-specific Pain Management" section in the original guideline). Detailed information on interventions can be found in the "Site-specific Pain Management" section and in the "Pharmacologic Management" sections of the original guideline.

Postoperative Pain Management

F. Patient with Acute Pain after Procedure/Operation

Patients managed by this algorithm are those who have undergone a procedure or operation with analgesia or anesthesia.

G. Determine Medical/Surgical Emergency Based on Vital Signs

Objective

Rapidly determine, in the immediate postoperative period, whether a medical and/or surgical emergency exists, and whether the patient is medically or surgically unstable.

Annotation

The postoperative evaluation must begin with a determination of whether there is need for emergency action, including immediate life-saving measures and/or immediate referral to an intensive level of care. This assessment consists of two levels:

1. Immediate assessment of the patient's vital signs:
    - Temperature
    - Pulse
    - Blood pressure
    - Respiratory status
    - Initial assessment of pain
2. More thorough but expeditious assessment:

    This phase of the assessment focuses on problems that may occur in a postoperative patient. It is important to convey to the patient and/or significant others the rationale and steps to be taken in this phase of the assessment.

    - Respiratory
        - Airway obstruction (e.g., problems with positioning of an endotracheal tube, poor positioning of the neck by obstruction by the tongue, and hemorrhage in the neck following such procedures as thyroidectomy)
        - Laryngospasm
        - Bronchospasm

        - Hypoxemia, from a variety of causes -- including sedation, intrapulmonary shunting, inadvertent administration of oxygen-poor inspired gases, pneumothorax, pulmonary edema, pulmonary embolism, pain causing decreased thoracic and/or diaphragmatic excursion, and failure of reversal of neuromuscular blocking agents. Pulse oximetry is critical to assessment for hypoxemia.
    - Circulatory
        - Hypotension from a variety of causes
        - Surgical bleeding/pneumothorax-including hypovolemia, cardiogenic shock, and septic shock. Prompt identification is essential to prevent hypoperfusion of vital organs.
        - Tachycardia
        - Hypertension--may be secondary to preexisting hypertension or may be related to the surgical procedure because of pain, hypercapnea (from hypoventilation), hypoxemia, or excessive intravascular fluid volume.
        - Dysrhythmias--predisposing factors include electrolyte imbalance (especially hypokalemia), hypoxia, dysphoria, hypercapnia, metabolic alkalosis and acidosis, and preexisting heart disease.
    - Neurologic
        - Failure to regain consciousness is most commonly due to the continued effect of anesthesia agents, sedatives, and preoperative medications. However, the clinician must consider other causes, such as hypothermia, hypoglycemia, hyperglycemia, hypoxia, and cerebrovascular event. Agitation may be from pain, but may also be due to hypoxia, metabolic causes, or intracerebral events.
    - Pain
        - Evaluate any new, acute unexpected reports of pain that are not related to the operation.
    - Nausea and vomiting
        - Nausea and vomiting are the most common postoperative complications, reported to occur in 90 percent of inpatient surgeries and 4 percent of outpatient surgeries. This problem is influenced by choice of anesthetic, antiemetic, and the type of surgery, and may lead to aspiration complications.

H. Assess and Document Pain

Objective

Evaluate and document postoperative pain as a guide to intervention.

Annotation

In order to accomplish adequate pain control, it is necessary to assess pain on a regular schedule as well as following any new pain control intervention.

- Assess pain intensity using a 0 to 10 numeric rating scale
- Ask patient to describe the pain (quality, duration and onset)
- Determine pain location from patient's report
- Document intensity, quality and location
- As time permits and as indicated by patient's condition, perform a more comprehensive pain assessment including description of behavior and impact
- Assess adverse effects associated with inadequate or intolerable interventions (sedation, inadequate respiration, nausea, vomiting, pruritis, numbness and weakness)

I. Determine Pain Management Treatment Plan or Modify Preoperative Plan If Indicated

Objective

Provide safe, effective, and timely pain control.

Annotation

Pain management is a complicated, multimodal process. To obtain adequate pain control, a systematic comprehensive treatment plan should be established. The treatment plan should be collaborative in nature and approved by the patient. The plan should be developed and documented as early in the perioperative course as possible.

The documented plan should address the following:

- Education
- Choice of treatment options:
    - Pharmacologic (includes route and dose)
    - Cognitive intervention
    - Physical intervention
- Discharge plan

Information regarding the components of the plan is included in the full text guideline in several sections:

- Treatment Options--select the appropriate treatment using the Summary: "Site-specific Pain Management".
- Type of Surgery--discussion of the evidence-based recommendation for the specific type of surgery
- Patient Education--general education for the patient and those taking care of the patient
- Specific Pharmacologic and Non-Pharmacologic Therapy--specific information regarding route and dosage for the specific intervention

J. Significant Pain Not Explained by Surgical Trauma? Significant Pain Consistent with Surgical Trauma?

Objective

Identify patients who may have a significant complication and need surgical re-evaluation.

Annotation

After the initial pain assessment, and before initiating the postoperative treatment plan, the clinician needs to determine if the pain is consistent with the recent surgical trauma.

Questions the provider should consider include:

- Is the pain level that which would typically be expected after a particular operation? Pain experience is individualized and dependent on a number of factors (see the "Site-specific Pain Management" section below and in the original guideline for discussion of typical expected pain).
- Is the location of the pain appropriate for this operation?
- Are measures that are normally used to control pain after this operation failing to provide relief?

The clinician should have a low threshold for consultation/evaluation. If the answers indicate a potential significant complication or an atypical postoperative course, then consultation is warranted.

K. Implement Pain Management Treatment Plan: Initiate Postoperative Analgesia

Please refer to the Summary Table in the section "Site-specific Pain Management" and the "Options for Postoperative Pain Management" section in the original guideline.

L. Provide Specific Patient and Family Education Regarding the Intervention

Objective

Provide the patient with education about treatment interventions that promote postprocedural comfort.

Annotation

Information to be included in pain education postoperatively should address the following:

Expectations:

- Expectation that pain can be controlled following surgery
- Goals for pain relief

Assessment:

- Ways of assisting in the measurement of pain
- What patients should report regarding pain and its treatment

Postoperative plan:

- Postoperative pain management plan (i.e., specific information about the interventions)
- Importance of patient involvement in plan (e.g., controlling patient controlled analgesia)

Interventions:

- How quickly the pain intervention should work
- When to ask for pain medication
- Patient concerns about the intervention (e.g., side effects, addiction, complications)
- Non-drug measures for pain relief (explain those applicable)
    - Physical modalities
    - Cognitive modalities

One of the primary concerns patients have in the preoperative setting is postoperative pain and discomfort.

Evidence

Reinforcing pain management principles helps the patient cope with postoperative pain. (III, B [Moore & Estey, 1999])

M. Did the Intervention Produce Adequate and Tolerable Pain Relief?

Objective

Determine whether the patient had an adequate response to interventions provided for pain relief.

Annotation

Initial pain assessment should include the patient's goal for pain relief measured as an intensity score (e.g., 0-10 scale) and function (e.g., what pain rating would be acceptable or satisfactory to him or her, considering the activities required for recovery or for maintaining a satisfactory quality of life?). Efficacy of pain relief should focus on the location of pain for which the patient received analgesia. If pain is located at another site, a complete initial pain assessment should be completed for that different site.

Adequacy of pain relief is then measured by the following:

0. Met patient's goal for pain relief, which included current pain intensity (e.g., <4 on 0-10 scale) and function (activity).

1. Pain control at a level that allows the patient to perform the functional requirements necessary for recovery (activity)
2. Duration of pain relief (e.g., did analgesia last between doses)
3. Patient satisfaction with pain relief

Possible function (activity/quality of life) from which to select appropriate measure of postoperative functioning:

4. Interference with the ability to cough and deep breathe
5. Interference with the ability to ambulate
6. Interference with mood
7. Interference with sleep
8. Interference with activities of daily living
9. Interference with ability to work (include work inside and outside the home)
10. Interference with relations with other people (interactions)
11. Interference with enjoyment of life

Evidence

Pain ratings of 4 or greater interfered markedly with activity. (II, B [Cleeland & Syriala, 1992])

N. Change Drug, Interval, Dose, Route, Modality; Add Adjuvant or Treat Side Effects

Objective

Modify treatment to achieve effective pain control with minimal harm and side effects.

Annotation

Adverse effects associated with inadequate and or intolerable interventions for pain management are provided in Table 1 of the original guideline and described below:

Increased Pain

Reports of increased pain require pain assessments to ensure that no untoward events have occurred (see "Pain Assessment" section of original guideline). In addition, the assessment will direct the therapy and alternatives selected.

Nausea/Vomiting

- Evaluation of postoperative nausea is to ensure stable vital signs and adequate control of pain.
- Unfortunately, opioids stimulate nausea and may require treatment (Cohen et al., 1992; Wang, 1996; gan et al., 1998; Chung et al.,

1999) or alteration of pain therapy to allow the patient to be nausea free with pain control.
- Because of high incidence of nausea, prophylactic antiemetic therapy is often given (Chen et al., 1996; Pitkanen et al., 1997; Helmy, 1999; Gan et al., 1997).
- The choice of antinausea agent is driven by patient factors and prior antinausea therapy. For example, if a dopamine antagonist was given for nausea earlier, the addition of a serotonin antagonist may be more helpful than a second dopamine antagonist.

Lethargy/Sedation/Respiratory Depression

- Evaluation is paramount to treatment of sedation.
- Respiratory depression secondary to opiates is preceded by lethargy and sedation; treatment is the same for this side effect.
- After causes of sedation other than analgesics have been addressed, adjusting the selected pain therapy is required (Kenady et al., 1992; Eriksson-Mjoberg et al., 1997; Passchier et al., 1993).
- If significant overdose of analgesics is suspected, use of reversal agents is indicated (naloxone 0.4 mg intramuscular/intravenous). If respiratory depression persists, this dose may need to be repeated and other causes considered.
- If there is no medical emergency, small doses of naloxone (0.04-0.2 mg) are preferred.

Itching/Pruritis

- Once allergic reactions have been ruled out, treatment of pruritis in the presence of appropriate opioid therapy is with antihistamines and opioid antagonists (Cohen et al., 1992; Gan et al., 1997).
- With regional analgesia techniques, it may be possible to eliminate the opioid component.

Numbness/Weakness

- Numbness is not associated with analgesics other than local anesthetics and the cause should be sought.
- Numbness in the affected area in the presence of regional analgesia should be evaluated (possible subarachnoid hematoma, abscess) and the dose adjusted.
- Weakness can be seen with analgesics usually in conjunction with other signs of relative overdose.
- Weakness seen with regional techniques should be minimized to allow for ambulation with assistance if desired.

Myoclonus/Seizures

- Seizure-like activity in the postoperative setting should be evaluated and treated.
- Some opioids, meperidine in particular, are associated with seizures and myoclonus.

- While very high doses of local anesthetics can cause seizures, this is unlikely in the postoperative setting unless a large amount is actually given.

Hallucinations

- Hallucinations in the postoperative patient can be due to a variety of causes including change in surroundings, sleep deprivation and intraoperative medications (H2 blockers, anticholinergics, opiates).
- Evaluations of hallucinations are often decided by "trial and error" techniques.

Dysphoria

- Postoperative dysphoria is unsettling to the patient and family and difficult to evaluate. Sometimes reassurance can be all that is needed, but it may also require changing of pain management techniques.
- It is more common with mixed opioid agonists/antagonists and antidopaminergic medications.

Urinary Retention

- Urinary retention is a common side effect of pharmacologic pain management and is more common after neuraxial administration.

Hypotension

- Hypotension due to systemic analgesics is rare and is likely due to hypovolemia and loss of sympathetic drive with appropriate analgesia.
- Hypotension from neuraxial opioids alone is unlikely.
- Hypotension with regional analgesia techniques is common and treated by replenishing fluids and altering the local anesthetic dose.
- Short term therapy can be accomplished with vasopressors until the above can be addressed.

O. Re-evaluate at Appropriate Intervals

Objective

Evaluate pain as a guide to further intervention.

Annotation

The timing for assessment of the efficacy of pain relief is dependent upon the situation. If the patient is in severe pain requiring upward titration of analgesics, pain assessment should be completed frequently (e.g., every 15 minutes). In general, pain should be assessed approximately 15-30 minutes after administering parenteral medication and 60 minutes after administering oral medication. During the initial 24-hour postoperative period, pain should be assessed at least every 2 to 4 hours. If pain is well controlled, the pain intensity should be assessed routinely with vital signs.

P. Provide Discharge Plan

Objective

Promote continuity of pain management after discharge.

Annotation

Provide the patient and family with a workable, effective and safe pain management program for use at home, foster continuity of pain management across the care continuum, and promote understanding of the treatment plan.

0. Discharge planning should begin at admission with an assessment of the home environment and support systems.
1. Pain management at home should be within the capability of the patient, significant others, and other home resources. Visiting nurses may serve as a valuable resource if a complex pain management plan is required.
2. The pain management plan should guide patients' expectations as to the likely time course of their pain and how to manage functionality and expected return to premorbid function.
3. A written pain management plan should be given to the patient. It should include:
    - Specific drugs to be taken
    - Dose and frequency of administration
    - Side effects management
    - Potential drug interactions
    - Methods to improve function while recovering
    - Precautions to follow when taking pain medication (e.g., activity limitations, dietary restrictions)
    - Contact person for pain problems and other postoperative concerns
    - Nonpharmacological methods
4. Potential use of over-the-counter medications and interactions with prescribed medication should be addressed.
5. Follow-up contact by day surgery staff regarding the procedure and pain management (for day surgery patients) should be scheduled.
6. Patients who will be discharged to a location other than home must have a comprehensive pain management plan in place and clearly communicated in the transfer orders.

Evidence

Assess the discharge environment to evaluate support for the pain management plan and address the patient's ability to adhere to treatment procedures. (III, B [Hughes et al., 2000; Jacobs, 2000])

Site-Specific Pain Management

Head and Neck Surgery

Pain relief regimens following neurosurgical procedures must not interfere with the ability to monitor neurologic status. (III-3, B[MacKersie, 1993])

Ophthalmic Surgery

- Regional anesthetics used during surgery provide better analgesia in the immediate postoperative period. (I, A [Shende et al., 2000]; II-2, A [Calenda et al., 1999]; II-2, B [Lai et al., 1999; Williams et al., 1995])
- Nausea and vomiting may be detrimental to surgical repair. Therefore, non-opiate pain medications postoperatively or regional anesthesia intraoperatively are preferred. (I, A [Shende et al., 2000]; II-2, B [Williams et al., 1995])

Craniotomies Surgery

- While pain may be less severe than other operations, there is a growing consensus that it remains undertreated. (I, A [Stoneham & Walters, 1995]; II-2, B [Quiney et al., 1996; DeBenedittis et al., 1996]; II-3, B [Dunbar & Lam, 1999])
- Post-operative pain control recommendations have been very conservative, with intramuscular codeine phosphate used as the most common postoperative analgesic. (I, A [Stoneham & Walters, 1995]; III, C [MacKersie, 1993])
- Codeine has been shown to be superior to tramadol as a postoperative analgesic and not significantly different from IV PCA morphine. (I, A [Stoneham & Walters, 1995])
- NSAIDs may be contraindicated in some settings due to concerns regarding intracranial bleeding. (II-2, A [Palmer et al., 1994])
- Incisional bupivicaine is helpful in the immediate postoperative phase to achieve pain control. (I, A [Bloomfield et al., 1998])

Radical Neck Surgery

- Pain from radical neck surgery is typically controlled with IM, IV, or IV PCA opiates due to frequent limitations in oral intake. (II-2, B[Bost et al., 1999]; II-3, A [Mom et al., 1996)
- Intraspinal medications are almost never used for postoperative pain control in this setting. (III, B [Tobias et al., 1990)

Oral-Maxillofacial Surgery

- Regional anesthesia is commonly provided intraoperatively by the surgeons to reduce both intraprocedural and early postprocedural pain. (I, A [Nicodemus et al., 1991]; II-3, B [Robiony et al., 1999])

Thorax (Non-cardiac) Surgery

Thoracotomy

- Effective postoperative pain control may be achieved by delivering an opioid or a combination of opioid and local anesthetic into the thoracic epidural

space. (I, A [Mahon et al., 1999; Brichon et al., 1994; Miguel & Hubbell, 1993])

- Mixing a local anesthetic with an opioid produces better analgesia, but randomized controlled trials indicate that there is a tendency toward more side effects when an opioid is added to a local anesthetic as compared to local anesthetic alone. (I, B [Mahon et al., 1999])
- The addition of local anesthetic to epidural opioid allows a significant reduction in the total dose of opioid required to produce equivalent analgesia. (I, A [Burgess et al., 1994])
- Epidural opioids (hydrophillil) may be delivered via a lumbar or thoracic approach. (I, B [Gaeta et al., 1995])
- There is no significant difference between lumbar and thoracic epidural administration of the highly lipid-soluble opioids, fentanyl and sufentanil. (I, A [Swenson et al., 1994]; II-1, B [Haak-van der Lely, 1994])
- There is no significant difference between epidural and intravenous administration of the highly lipid-soluble opioids. (I, A [Sandler et al., 1992; Guinard et al., 1992]; I, B [Baxter et al., 1994])
- Pre-operative initiation of continuous local anesthetic epidural block has been associated with reduced long-term (at 6 months) pain. (I, A [Obata et al., 1999])
- Continuous paravertebral blocks are capable of providing equivalent or superior pain control when compared to epidural analgesia following thoracotomy. (I, B [Catala et al., 1996])
- Continuous paravertebral blocks are superior to interpleural block following thoracotomy. (II-2, B [Richardson et al., 1995])
- Direct injection of a local anesthetic alone to block intercostal nerves can be used. Analgesia only lasts 6-12 hours. More prolonged relief can be obtained by performing cryoanalgesic blocks of the intercostal nerves. (I, B [Burcerius et al., 2000)
- Interpleural local anesthetics can be delivered via catheter between the parietal and visceral pleura and a local anesthetic injected at 4-6 hour intervals or infused continuously to produce analgesia. Clinical use of this technique has not found widespread acceptance and it has been out of favor for many years. (I, A [Barron et al., 1999; Raffin et al., 1994]; I, B [Gaeta et al., 1995])
- The addition of intercostal nerve blocks to intrathecal opioids does not significantly improve postoperative pain control and has been associated with decreased pulmonary function after 24 hours. (I, B [Liu et al., 1995])
- Opioids via oral, IV, IM, or IV PCA can provide postoperative pain control or be used as an adjunct to regional or neuraxial analgesia. (III, C)
- The use of NSAIDs as an adjunct to other postoperative analgesics is beneficial for non-incisional pain. (I, A [Singh et al., 1997])
- Regional analgesic techniques provide better pulmonary toilet than IV PCA. (I, B [Benzon et al., 1993])
- Opiates should be used cautiously in the setting of severe pulmonary disease due to the potential for respiratory depression. (I, B [Benzon et al., 1993])

Mastectomy

- Paravertebral or intercostal blocks may provide postoperative analgesia for up to 24 hours. (I, A [Atanassoff et al., 1994; Klein et al., 2000])

- Thoracic epidural analgesia provides excellent pain control and patient satisfaction. (I, A [Yeh et al., 1991])
- NSAIDs may be used for postoperative pain. (I, A [Chan et al., 1996])

Thoracoscopy

- Supplemental treatment with NSAIDs or the use of transcutaneous electrical nerve stimulation (TENS) may allow a significant reduction in the use of postoperative opiate pain medications. (II-1, A [Perttunen et al., 1999])
- Pain control in the immediate postoperative period may be enhanced by injection of local anesthetic through the thoracoscope at the end of surgery. (I, A [Lieou et al., 1996])

Thorax (Cardiac) Surgery

Coronary Artery Bypass Graft (CABG)

- In the first 24 hours, non-patient dependent routes may be preferred (i.e., nurse administration). (I, A [Munro et al., 1998; O'Halloran & Brown, 1997; Myles et al., 1994]; I, B [Checketts et al., 1998]; II-2, A [Tsang & Brush, 1999])
- After 24 hours, IV PCA transitioning to oral is preferred. (I, B [Boldt et al., 1998])
- Neuraxial analgesia is rarely used, but helps pulmonary function. (I, B [Stenseth et al., 1996])
- Intrathecal opiates may be helpful in the first 24 hours but may delay extubation. (I, A [Chaney et al., 1999]; I, B [Chaney et al., 1996; Shroff et al., 1997])

Minimally Invasive Direct Coronary Artery Bypass (MID-CAB)

- Intrathecal opiates may be helpful in the first 24 hours. (I, A [Chaney et al., 1999])
- Neuraxial analgesia is rarely used. (I, B [Stenseth et al., 1996])
- Intraoperative cryoablation may improve postoperative pain control. (II-1, B [Bucerius et al., 2000; Pastor et al., 1996])

Upper Abdominal Surgery

- Multimodal analgesia using local anesthetic, NSAIDs and opiates provides improved pain control, decreased nausea, and faster discharge following laparoscopic cholecystectomy. (I, A [Michaloliakou et al., 1996])
- Pain following upper abdominal surgery produces inspiratory muscle dysfunction. This dysfunction is reduced with analgesia. (I, A [Vassilakopoulos et al., 2000])
- IV PCA morphine produces better analgesia than IM morphine, without any increase in postoperative hypoxemia. (I, A [Wheatley et al., 1992])
- Patients using IV PCA morphine used more morphine and had better analgesia than patients receiving IM morphine on demand. IV PCA patients also experienced more fatigue and had less vigor than patients receiving IM morphine. (I, A [Passchier et al., 1993])

- Epidural analgesia, with a combination of opiates and local anesthetic, provides better pain control during rest and activity, and is the treatment of choice. It is also associated with more rapid recovery of bowel function. (I, A [George et al., 1994; Mann et al., 2000; Liu et al., 1995]; III, A [Mulroy et al., 1996])
- Epidural analgesia is associated with less postoperative myocardial ischemia (than IV PCA with morphine). (II-2, A [deLeon-Casasola et al., 1995])
- For optimal analgesia, the thoracic epidural route should be used for pain relief after upper abdominal surgery. (I, A [Wiebalck et al., 1997; Chisakuta et al., 1995; George et al., 1994])
- Pain control with intercostal nerve block in combination with opiates is more effective than opiates alone after subcostal incisions. Intercostal nerve blocks do not significantly improve analgesia following midline incisions. (I, B [Engberg et al., 1985])
- Phenol with local anesthetic has been shown to increase the duration of intercostal block and improve analgesia following cholecystectomy. (I, B [Maidatsi et al., 1998])
- Infiltration of the incision/wound with local anesthesia improved postoperative analgesia provided by epidural bupivicaine/morphine during mobilization and reduced the need for supplemental intramuscular morphine. (I, B [Bartholdy et al., 1994])
- Ketorolac given before or after laparoscopic cholecystectomy reduced postoperative pain and facilitated the transition to oral pain medication. (I, A [Lane, 1996])
- Pain relief promotes return of respiratory function. (I, A [Vassilakopoulos et al., 2000])
- Aggressive perioperative management with epidural, NSAIDs, early feeding, and ambulation is associated with improved recovery and rapid discharge after laparoscopic colonic surgery. (II-3, B [Kehlet et al., 1999]; II-3, A [Bardram et al., 1995])
- Laparoscopic cholecystectomy is associated with less pain than open cholecystectomy. (I, A [McMahon et al., 1994])
- Patient-controlled epidural analgesia with a background infusion is more effective than patient-controlled epidural analgesia alone after gastrectomy. (I, A [Komatsu et al., 1998])

Laparotomy

- Epidural analgesia produces better pain control at rest and with activity. It is also associated with earlier return to normal mental status in the elderly, better satisfaction, and more rapid recovery of bowel function. (I, A [Liu et al., 1995; Mann et al., 2000])
- Aggressive perioperative management with epidural, NSAIDs, early feeding, and ambulation is associated with improved recovery and rapid discharge after laparoscopic colonic surgery. (II-3, A [Bardram et al., 2000]; II-3, B [Kehlet, 1999; Bardram et al., 1995])

Laparoscopic Cholecystectomy

- Multimodal analgesia using local anesthetic, NSAIDs, and opiates provides improved pain control, decreased nausea, and faster discharge following laparoscopic cholecystectomy. (I, A [Michaloliakou, 1996])

- Active removal of residual pneumoperitoneum reduces postoperative pain following laparoscopic cholecystectomy. (I, A [Fredman et al., 1994])
- Suprahepatic suction drains placed by the surgeon have been shown to reduce shoulder tip pain following laparoscopic cholecystectomy. (II-3, B [Jorgensen et al., 1995])

Nephrectomy

- Interpleural local anesthetics have been shown to be effective in reducing opiate requirements postoperatively. (III, B [Greif et al., 1999])

Lower Abdominal and Pelvis Surgery

- Epidural opiates in the postoperative period provide better analgesia with fewer side effects than IV PCA morphine. (I, A [Eriksson-Mjoberg et al., 1997])
- Ambulation in the perioperative period is associated with a decreased risk of thromboembolic complications and more rapid recovery of bowel function. (II-3, A [Bardram et al., 2000])

Hysterectomy

- Wound infiltration with local anesthetic does not reduce morphine requirements after abdominal hysterectomy. (I, A [Cobby & Reid, 1997])
- IV PCA opiates result in better analgesia with fewer adverse effects than intermittent IM opiates and result in higher patient satisfaction. (I, A [Egbert et al., 1990; Ballantyne, 1993]])
- Epidural morphine provides better pain relief with fewer side effects than IV PCA morphine. (I, A [Eriksson-Mjoberg et al., 1997])
- TENS units may be effective. (I, B [Hamza et al., 1999; Chen et al., 1998])
- NSAIDs do not produce preemptive analgesia. (I, B [Rogers et al., 1995]; I, D [Danou, 2000])
- NSAIDs reduce postoperative opiate requirements. (I, A [Cobby et al., 1999; Varrassi et al., 1999; Gabbott, 1997])

Radical Retropubic Prostatectomy

- IV PCA opiates result in better analgesia with fewer adverse effects than intermittent IM opiates and result in higher patient satisfaction. (I, A [Fobert et al., 1990; Ballantyne et al., 1993])
- Epidural analgesia may be used to provide superior pain control and may be associated with reduced postoperative pain for several weeks. (I, A [Shir et al., 1994; Gottschalk et al., 1998])
- Postoperative administration of ketorolac instead of IV PCA morphine is associated with earlier recovery of bowel function, shorter hospitalization, and lower overall costs. (II-3, B [See et al., 1995])
- Postoperative administration of ketorolac is a useful adjuvant to epidural analgesia to improve postoperative pain control. (I, A Grass et al., 1993])
- Intraoperative administration of Ketorolac does not decrease postoperative pain or improve analgesia. (I, D [Fredman et al., 1996])
- FasTENS is an effective adjuvant for postoperative analgesia following retropubic prostatectomy. (I, A [Merrill, 1989])

Inguinal Hernia

- Regional anesthesia may have advantages in preventing postoperative pain and can be associated with fewer postoperative side effects. (I, A [Song et al., 2000; Ding & White, 1995]; I, B [Moniche et al., 1998])
- Regional analgesia, including local field block or peripheral nerve block, may be used to provide prolonged postoperative analgesia. (I, A [Wassef et al., 1998])
- Preoperative administration of ketorolac reduces postoperative pain following inguinal herniorrhaphy and the need for additional postoperative analgesic medication. There is no advantage to delivering the medication within the wound or giving IV over IM drug. (I, B [Ben-David et al., 1996])

Back/Spinal Surgery

NSAIDs may affect healing of spinal fusions. (II-1, A [Glassman et al., 1998])

Laminectomy

- Laminectomy pain is treated with IV PCA, IV, IM, and oral medications. (I, A [Colwell & Morris, 1995])
- Nonsteroidals may be effective. (I, A [Rosenhow et al,. 1998; Rowe et al., 1992])
- Regional techniques can be used for superior postoperative pain control. (I, B [Joshi et al., 1995; Ibrahim et al., 1986]; I, C [Kundra et al., 1997])
- Local infiltration of the incision may be helpful. (I, B [Cherian et al., 1997])
- TENS is not helpful. (I, B [McCallum et al., 1988])

Spinal Fusion

- Regional anesthesia is not used; pain relief is not superior to patient-controlled analgesia. (I, A [Cohen et al., 1997]; I, C [France et al., 1997])
- NSAIDs are helpful. (I, C [Reuben et al., 1998])
- There are concerns regarding increased rates of non-union following NSAID use. (II-1, A [Glassman et al., 1998])

Surgery of Extremities/Vascular Surgery

- Regional anesthesia/analgesia techniques are associated with fewer complications, reduced morbidity and mortality, a high patient satisfaction rate, and the ability to discharge the patient with prolonged analgesia. (I, A [Rodgers et al., 2000])
- In some cases, addition of other drugs (e.g., clonidine) to the local anesthetic will prolong the duration of action. (I, A [Reinhart et al., 1996])

Total Hip Replacement

- Intravenous morphine administered at the end of surgery to spontaneously breathing patients is associated with more rapid postoperative pain control, decreased opiate doses, and reduced respiratory depression. (I, A [Pico et al., 2000])

- Lumbar plexus blocks performed prior to hip surgery are associated with a moderate reduction in blood loss and a significant improvement in early analgesia. (I, A [Stevens et al., 2000])
- Three-in-one block does not contribute in a significant fashion to postoperative pain control following total hip arthroplasty using the posterior approach. (I, A [Uhrbrand et al., 1992])
- Adherence to guidelines for neuraxial anesthesia/analgesia in the presence of anticoagulants will help to minimize the risk of thromboembolic complications. (American Society of Regional Anesthesia [ASRA], 1998}
- At rest, epidural analgesia is slightly better than IV patient-controlled analgesia. (I, B [Wulf et al., 1999])
- Intrathecal administration of morphine in small doses is capable of providing excellent analgesia. (I, A [Slappendel et al., 1999])
- The choice of fentanyl or morphine along with bupivicaine does not appear to make a significant difference in postoperative pain relief or side effects. (I, B [Berti et al., 1998])
- Continuous spinal anesthesia may provide more complete analgesia and less muscle spasm than epidural analgesia. (I, B [Mollmann et al., 1999])
- Intrathecal clonidine is capable of prolonging the duration of spinal anesthesia, but is markedly inferior to intrathecal morphine in providing subsequent postoperative analgesia. [Fogarty et al., 1993]
- Administration of ketorolac tromethamine to patients receiving intrathecal opiates for postoperative pain control will reduce the need for additional opiates, but will not change the incidence of side effects. (I, A [Fogarty et al., 1995])
- Patients may typically be converted to oral analgesics on the second to third postoperative day. Regularly administered oral opiates are capable of providing good postoperative pain control. (I, A [Bourke et al., 2000])

Total Knee Replacement

- Improved pain control facilitates participation in physical therapy and improves outcome. (I, A [Capdevila et al., 1999; Singelyn et al., 1998])
- Adherence to the guidelines for neuraxial anesthesia/analgesia will help to minimize the risk of thromboembolic complications. (ASRA, 1998)
- Single shot, continuous epidural, and continuous regional techniques produce better overall pain control. (I, A [Singelyn & Gouverneur, 2000; I, B [Ganapathy et al., 2000; Allen et al., 1998])
- The addition of a sciatic nerve block to a femoral nerve block does not significantly improve postoperative pain control when compared to the femoral nerve block alone. (I, E [Allen et al., 1998])
- Intrathecal opioids may be used to improve postoperative pain control. (I, B [Cole et al., 2000])
- Intra-articular opioids are not effective for postoperative pain control following total knee arthroplasty. (I, E [Klasen et al., 1999])
- Intravenous regional delivery of opiates does not improve postoperative pain control over IM opiates following total knee arthroplasty. (I, E [McSwiney et al., 1997])

Knee Arthroscopy and Arthroscopic Joint Repair

- The use of a combined sciatic and femoral nerve block provides good surgical conditions and prolonged analgesia. (II-3, B [Sansone et al., 1999])
- Prolonged analgesia that is better than local anesthetic alone may be obtained with the use of intra-articular morphine or clonidine. (I, A [Stein et al., 1991; Dalsgaard et al., 1994; Gentili et al., 1996; Kanbak et al., 1997; Cepeda, 1997])
- Keeping a tourniquet inflated for 10 minutes after administering intra-articular morphine provides superior analgesia and decreases the need for supplemental analgesics. (I, A [Whitford et al., 1997])
- The preponderance of the literature supports the use of intra-articular morphine following knee surgery. (I, A [Christensen et al., 1996])
- Ice or a "Cryo/Cuff" device will help to control both pain and swelling following arthroscopy. (I, B [Whitelaw et al., 1995])

Amputation

- Preoperative infusions of local anesthetic alone or local anesthetic with opiate and/or clonidine may be useful in minimizing postoperative phantom limb pain. (I, B [Jahangiri et al., 1994; Bach et al., 1988])
- Some studies using preoperative infusions have not demonstrated any benefit. (I, D [Nikolaisen et al., 1997; Elizaga et al., 1994])
- Patients receiving preoperative, intraoperative, and postoperative epidural bupivicaine and morphine had outcomes similar to patients receiving epidural bupivicaine and morphine postoperatively alone. (I, D [Nikolaisen et al., 1996])
- Postoperative infusions of local anesthetic along the sciatic or posterior tibial nerve are a safe and effective method for the relief of postoperative pain but do not prevent residual or phantom limb pain. (I, A [Pinzur et al., 1996]; III, C)
- Postoperative infusions of local anesthetic into nerve sheaths provide excellent postoperative analgesia following upper extremity amputation, but do not affect long term phantom limb pain. (II-3, C [Enneking et al., 1997; Iacono et al., 1987])
- In those patients with a significant component of phantom limb pain, tricyclic antidepressants or anti-epileptic medications may need to be initiated in the postoperative period. [Baron et al., 1998]
- TENS treatment of below-knee amputation (BKA) is not supported. (I, D {Finsen et al., 1988])

Shoulder -- Open Rotator Cuff Repair or Arthroscopic Sub-acromial Decompression

- Techniques that minimize the need for centrally acting drugs will help to minimize undesirable side-effects and unplanned hospital admission. (III, B [D'Alessio et al., 1995])
- NSAIDs following subacromial decompression significantly reduce the need for additional analgesics. (I, A [Hoe-Hansen & Norlin, 1999])
- Regional anesthesia can be utilized as a sole anesthetic or in combination with a general anesthetic to provide postoperative pain control. (I, A [Al-Kaisy et al., 1998])
- Regional anesthetic blocks may be performed either preoperatively or postoperatively and provide improved pain control as compared to opioid

analgesics alone. (I, A [Borgeat, 2000; Borgeat et al., 1998]; I, B Lehtipalo et al., 1999])
- Suprascapular nerve blocks may provide a significant degree of postoperative analgesia. (I, A [Ritchie et al., 1997])
- The addition of opioid analgesics to local anesthetics for interscalene block does not improve the quality or duration of analgesia as compared to local anesthetic alone. (I, E [Flory et al., 1995])
- Patients may be sent home with pain pumps that deliver local anesthetic into the wound or along nerve bundles in addition to oral medications and instructions to use ice to minimize pain and swelling. (I, A [Savoie et al., 2000])

Vascular Surgery

- The use of regional anesthesia intraoperatively and postoperatively has been associated with decreased morbidity and mortality following vascular surgical procedures. (I, A [Tuman et al., 1991; Rodgers et al., 2000]; I, C [Christopherson et al., 1993])
- Peripheral nerve blocks may be used to provide superior analgesia following femoropopliteal bypass as compared to IV PCA alone. (I, A [Griffith et al., 1996])

Options for Postoperative Pain Management

Non-Pharmacologic Management

Cognitive Modalities

Distraction, Relaxation

- Distraction and relaxation techniques are useful as adjuncts to analgesic interventions. (I, A [Bruehl et al., 1993; Good et al., 1999]; III, A [Good, 1996; Seers & Carroll, 1998])
- Distraction techniques have shown benefit in relief of postoperative pain in: abdominal operation, hysterectomy, coronary artery bypass graft, chest tube removal. (I, A [Good et al., 1999; Broscious, 1999; Madden et al., 1978; Miro & Raich, 1999; Zimmerman et al., 1996])
- Better benefit is achieved when patients are taught strategies prior to the operative procedure. (III, A [Morgan et al., 1985])

Hypnosis

- Hypnosis was associated with improvements in pain and anxiety, reduction in analgesic requirements, and greater patient satisfaction. (I, B [Faymonville et al., 1997])

Physical Modalities

Transcutaneous Electrical Nerve Simulation (TENS)

- TENS is effective for pain management in postoperative conditions. (III, A [Gersh, 1992; Mannheimer & Lampe, 1984]; III, C [Carroll et al., 1996])
- TENS is effective over incision sites. (III, B [Tyler et al., 1982])
- TENS is effective for hand operations. (III, A [Bourke et al., 1984])
- TENS is effective for thoracotomy. (III, A [Warfield et al., 1985])
- TENS is effective for oral facial pain. (III, A [Hansson et al., 1986])
- TENS is effective for abdominal pain. (I, A [Hamza et al., 1999; Chen et al., 1998]; I, B [Hymes et al., 1974; Cooperman et al., 1977]; III, A [Ali et al., 1981])
- TENS is effective for post-cesarean section. (III, A [Smith et al., 1986])
- TENS is effective for pain for total hip replacements. (III, A [Pike, 1978])
- TENS is effective for knee replacements. (I, B [Sabile & Mallory, 1978])
- TENS is effective for shoulder pain. (III, B [Bruzga & Speer, 1999])
- TENS is effective for pain from cholecystectomy. (I, A [Rosenberg et al., 1978])
- TENS is effective for pain from lumbar spine. (III, A [Solomon et al., 1980])
- TENS is effective for pain from foot surgery. (I, B [Cornell et al., 1984])
- TENS is effective for use in combination with exercise for pain. (II-2, A [Harvie, 1979])

Cold

- Can increase pain threshold, reduce local swelling, decrease tissue metabolism and/or bleeding, and decrease muscle spasm and spasticity. (III, A [Wall & Melzack, 1989; Bonica, 2001])
- Effective for knee pain. (I, A [Barber et al., 1998; Brandsson et al., 1996; Levy & Marmer, 1992; Healy et al., 1994]; I, B [Webb et al., 1998; Lessard et al., 1997; Cohn et al., 1989]; III, B [Brown, 1996])
- Effective for shoulder pain. (III, A [Speer et al., 1996]; III, B [Bruzga & Speer, 1999])
- Effective for perineal pain. (I, A [Steen et al., 2000])
- Effective for incisional pain. (I, A [Hargreaves & Lander, 1989])
- Effective for dental pain. (I, A [Bastian et al., 1998; Melzack, 1980])
- Effective for thoracotomy. (III, A [Seino et al., 1985])
- Use is recommended as an adjunct to other treatments, especially compression. (III, A [Moore & Cardea, 1977; Basur et al., 1976]])

Heat

- Technique should be initiated 48 hours following the operation and used in combination with other treatments. (III, A [Agency for Health care Policy and Research [AHCPR], 1992])

Exercise

- Exercise reduces the risk of venous thrombosis after surgery. (I, A [McNally et al., 1997]; I, B [Sochart & Hardinge, 1999])
- Effective for management of knee pain. (I, A [McCarthy et al., 1993]; III, A [Walsh, 1980]]; III, B [Campbell, 1990; Brown, 1996; Coutts et al., 1989]]; III, C [Morris, 1995; Smidt et al., 1990])
- Effective for shoulder pain. (III, B [Bruzga & Speer, 1999])

- Effective for discectomy pain. (I, A [Danielson et al., 2000]; III, B [Deyo, 1983])

Positioning

- Technique should be done every two hours, with assistance if necessary. (III, A [AHCPR])

Immobilization/Rest

- Bed rest (II-2, E [Quebec Task Force])
- Limited period of time, less than two days. (III, B [Deyo, 1983])

Massage

- Massage is beneficial as adjunct treatment for general pain management. (II-2, E [Quebec Task Force, 1981]; III, C [Jurf & Nirschl, 1993; Heffline, 1990])

Acupuncture

- May reduce nausea and vomiting if used in early postoperative period. (III, B [National Institute of Health [NIH], 1997; Mayer, 2000])
- Acupuncture, in combination with pharmacological interventions, may lower the need for medication and reduce the risk for side effects from these drugs. (III, C [National Center for Complementary and Alternative Medicine [NCAAM], 2001])

Definitions:

Quality of Evidence

I Evidence is obtained from at least one properly randomized controlled trial (RCT).

II-1 Evidence is obtained from well-designed controlled trials without randomization.

II-2 Evidence is obtained from well-designed cohort or case-control analytical studies, preferably from more than one center or research group.

II-3 Evidence is obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments could also be regarded as this type of evidence.

III Opinions of respected authorities are based on clinical experience, descriptive studies in case reports, or reports of expert committees.

Recommendation Grades

A. A strong recommendation, based on evidence or general agreement, that a given procedure or treatment is useful/effective, always acceptable, and usually indicated.
B. A recommendation, based on evidence or general agreement, that a given procedure or treatment may be considered useful/effective.
C. A recommendation that is not well established, or for which there is conflicting evidence regarding usefulness or efficacy, but which may be made on other grounds.
D. A recommendation, based on evidence or general agreement, that a given procedure or treatment may be considered not useful/effective.
E. A strong recommendation, based on evidence or general agreement, that a given procedure or treatment is not useful/effective, or in some cases may be harmful, and should be excluded from consideration.

CLINICAL ALGORITHM(S)

Algorithms are provided for:

- Management of Postoperative Pain - Preoperative Management Algorithm
- Management of Postoperative Pain - Postoperative Management Algorithm

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The quality and strength of evidence are provided for selected recommendations (see "Major Recommendations" field). Where evidence was ambiguous or conflicting, or scientific data were lacking, the clinical experience within the multidisciplinary group guided the development of consensus-based recommendations.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

The system-wide goal of using evidence-based guidelines is to improve the patient´s outcome. In general, the expected outcome of successful implementation of this guideline is to improve the postoperative experience, and to reduce the morbidity that is associated with unmanaged care. Effective pain management is associated with patient satisfaction, earlier mobilization, shortened hospital stay, and reduced costs.

POTENTIAL HARMS

Both non-pharmacologic and pharmacologic modalities for pain management carry risks for side effects or complications. Please refer to the original guideline for

details concerning specific interventions and methods to achieve effective pain control with minimal harm and side effects.

CONTRAINDICATIONS

CONTRAINDICATIONS

See the original guideline for contraindications and cautions for specific non-pharmacologic and pharmacologic interventions for postoperative pain management.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- Clinical practice guidelines, which are increasingly being used in health care, are seen by many as a potential solution to inefficiency and inappropriate variations in care. Guidelines should be evidence-based as well as based upon explicit criteria to ensure consensus regarding their internal validity. However, it must be remembered that the use of guidelines must always be in the context of a health care provider's clinical judgment in the care of a particular patient. For that reason, the guidelines may be viewed as an educational tool analogous to textbooks and journals, but in a more user-friendly tone.
- This guideline is not intended as a standard of care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advances and patterns evolve. The ultimate judgment regarding a particular clinical procedure or treatment course must be made by the individual clinician, in light of the patient's clinical presentation, patient preferences, and the available diagnostic and treatment options. The guideline can assist care providers, but the use of a clinical practice guideline must always be considered as a recommendation, within the context of a provider's clinical judgment, in the care for an individual patient.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm
Pocket Guide/Reference Cards

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

RELATED QUALITY TOOLS

- Management of Postoperative Pain - Preoperative Management Algorithm

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Department of Defense, Veterans Health Administration. Clinical practice guideline for the management of postoperative pain. Version 1.2. Washington (DC): Department of Defense, Veterans Health Administration; 2002 May. Various p.

ADAPTATION

The developers incorporated information from several existing, evidence-based guidelines into a format that would maximally facilitate clinical decision-making. The effort drew, among others, from the following sources:

- Acute Pain Management Guideline Panel. Acute Pain Management: Operative or Medical Procedures and Trauma. Clinical Practice Guideline. AHCPR pub. No. 92-0032. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, U.S. Department of Health and Human Services. Feb 1992.
- VHA, Pain as the 5th Vital Sign Toolkit, Washington, DC: National Pain Management Coordinating Committee, October 2000.
- Pain Standards for 2001, Joint Commission on Accreditation of Healthcare Organizations, 2001, Available at: www.jcaho.org/standards/stds2001_mpfrm.html.

DATE RELEASED

2001 Jul (revised 2002 May)

GUIDELINE DEVELOPER(S)

Department of Defense - Federal Government Agency [U.S.]
Department of Veterans Affairs - Federal Government Agency [U.S.]
Veterans Health Administration - Federal Government Agency [U.S.]

GUIDELINE DEVELOPER COMMENT

The Management of Postoperative Pain Guideline was developed by and written for clinicians by clinical experts from the Department of Defense (DoD), Veterans Health Administration (VHA), academia, and a team of guideline facilitators from the private sector. An experienced moderator facilitated the multidisciplinary working group that included anesthesiologists, internists, nurses, pharmacists, and expert consultants in the field of guideline and algorithm development.

SOURCE(S) OF FUNDING

United States Government

GUIDELINE COMMITTEE

Management of Postoperative Pain Working Group

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Participants of The Working Group: Phyllis K. Barson, MD; Laxmi N. Berwa, MD; John Brehm, MD; Thomas Calhoun, MD; Mike Cantor, MD; Michael Craine, PhD; Mary Dallas, MS, PT, CWS; Mark Enderle, MD; Rosalie Fishman, RN, MSN, CPHQ; Francine Goodman, PharmD, BCPS; Geoffrey Grammer, MD; Susan Hagan, ARNP, MS; Cheryl Haley, RN, MA, CCM; Clark Holmes, MD; Sarah Ingersoll, RN, MS, MBA; Arthur Kaufman, MD; Andrew Kowal, MAJ, MC, USA; Paul M. Lambert, DDS; Thomas Larkin, MAJ, MC, USA; Patricia Lee, RN, DNSc; Tamara Lutz, RN, MN, CPHQ; Louise Nelson, RN; Richard Rosenquist, MD; Jack Rosenberg, MD; Diana Ruzicka, RN, MSN, AOCN, CNS; Alice M. Savage, MD, PhD; Charles Sintek, MS, RPh, BCPS; David Spencer, MD; Oded Susskind, MPH; Jane H. Tollett, PhD, RN; Dennis C. Turk, PhD; Hal Wain, MD; Debby Walder, RN, MSN; Timothy Ward, MD; Christine D. Winslow

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Department of Veterans Affairs Web site.

Print copies: Department of Veterans Affairs, Veterans Health Administration, Office of Quality and Performance (10Q) 810 Vermont Ave. NW, Washington, DC 20420.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Postoperative Pocket Card #1. Washington (DC): Department of Defense, Veterans Health Administration; 2002 Jun. 2 p.
- Postoperative Pocket Card #2. Washington (DC): Department of Defense, Veterans Health Administration; 2002 Jun. 2 p.
- VHA/DoD clinical practice guideline for the management of postoperative pain – key points. Washington (DC): Department of Defense, Veterans Health Administration; 2002 May. 2 p.
- VHA/DoD clinical practice guideline for the management of postoperative pain – Guideline overview. Washington (DC): Department of Defense, Veterans Health Administration; 2002 May. 4 p.
- VHA/DoD clinical practice guideline for the management of postoperative pain – Executive Summary. Washington (DC): Department of Veterans Affairs (U.S.); 2002 Apr. 10 p.

Electronic copies available from the Department of Veterans Affairs (VA) Web site.

Print copies: Department of Veterans Affairs, Veterans Health Administration, Office of Quality and Performance (10Q) 810 Vermont Ave. NW, Washington, DC 20420.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on January 14, 2003. The information was verified by the guideline developer on March 14, 2003. This summary was most recently updated on May 3, 2005 following the withdrawal of Bextra (valdecoxib) from the market and the release of heightened warnings for Celebrex (celecoxib) and other nonselective nonsteroidal anti-inflammatory drugs (NSAIDs).

COPYRIGHT STATEMENT

Date Modified: 5/9/2005